

FITNESS AND STRESS LEVELS
//
IN REGISTERED NURSES

A Thesis
Presented to
The Division of Nursing
Drake University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science in Nursing

by
Ronald D. Gauerke
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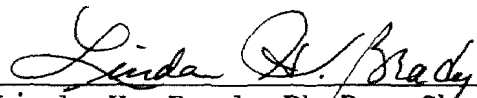
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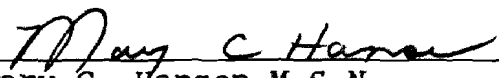
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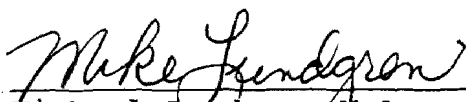
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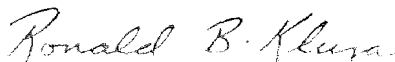
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FITNESS AND STRESS LEVELS
IN REGISTERED NURSES

An Abstract of a Thesis by
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May, 1991
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The problem. The purpose of this study was to determine the effect of exercise related fitness on the stress levels of female staff nurses. A convenience sample of 122 nurses participated.

Procedure. Stress was measured with the Health Problems Inventory developed by Jones. Fitness was determined by the use of an exercise history questionnaire. Criteria suggested by Cooper was applied to judge subjects as either fit or not fit. Information about other variables which may affect stress was also gathered. Also, subjects were asked to provide their perception of their level of fitness.

Findings. This study found a significant relationship ($p < 0.05$) between fitness and lower stress. Additional findings included significantly lower stress in part-timers, those with basic + BSN education, and in nurses who perceived themselves as fit.

Conclusions. This study suggests that physical fitness may be of benefit in reducing stress in nurses. Part-time status, perception of fitness, and BSN completion may also reduce stress.

Recommendations. Replication of this study in another setting as well as additional studies of activities that may reduce stress are recommended.

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CHAPTER I

INTRODUCTION

Stress is a concept with which most individuals are somewhat familiar. Newspapers, popular magazines, and television talk shows have given much attention to this topic. Originally used in the field of physics to refer to any strain or pressure applied to a system (Everly & Rosenfeld, 1981), stress is now used by people in everyday conversations as they describe their reactions to the pressures of life. People speak of stress on the job, stress in the home, stress in school, and stress on the athletic field. Stress, it seems, is truly ubiquitous; we cannot avoid it. Since stress is a part of our daily lives, it behooves us to learn to deal with it successfully.

Most individuals consider their jobs to be stressful. People interviewed in Working (Terkel, 1974), be they janitors, gas meter readers, lawyers, or flight attendants, spoke of the stress inherent in their work. Selye (1976) describes several occupations in terms of their stress-association and includes nursing in his discussion of stressful jobs.

The profession of nursing has contributed much literature to the examination of stress. The majority of this work has been conducted in the critical care setting. Investigators such as Bilodeau (1973), Jacobson (1978),

Oskins (1979), and Bailey, Steffen, and Grout (1982) believed that the intensive care units were more stressful than other areas of nursing. A review of nursing literature concerning stress was conducted by Stehle (1981). A total of 98 articles dealing with stress in nursing were found. Of this group, 65 articles were directed toward critical care nursing stress. Stehle (1981) concluded that while critical care nursing is highly stressful, there was no evidence to confirm that it was more stressful than other types of nursing.

Subsequent research by Kelly and Cross (1985), Keane, Ducette, and Adler (1985), and MacNeil and Weisz (1987) found that other areas of nursing were at least as stress generating as the intensive care units. These studies concluded that stress can be a problem in a variety of nursing settings. Gardner, Parzen, and Stewart (1980) and Albrecht (1982) point out that the nursing occupation is inherently stressful. Issues such as life and death, short-staffing, friction with peers, and the difficulties associated with patient care contribute to the high levels of stress believed to be experienced by practicing nurses.

Selye (1965) says that stress is not necessarily bad for the individual. He describes both eustress (good stress) and distress (bad stress). Stress may be pleasant or unpleasant. Too much stress can take its toll, however.

Tedesco-Carreras (1988, p. 39), nurse psychotherapist and stress management consultant, lists some possible physical and emotional manifestations of excessive stress levels:

Physical

weight loss
weight gain
nausea, vomiting
diarrhea
headaches
back pain
panic attacks
hives or allergies
palpitations.

Emotional

nervousness, worry
insomnia, fatigue
irritability
feeling depressed
crying spells
difficulty in concentrating
confusion
substance abuse

Since excessive levels of stress can lead to undesirable reactions in the nursing population, it would seem to be desirable to develop methods to eliminate stress. The elimination of troublesome stressors in the nurse's work environment, although a tempting goal, would not be very productive for several reasons: nurses encounter excessive stressors in their personal lives as well as in their professional lives; and even if the work environment could be structured to be free of all stressors, the nurse's personal stressors could still result in an excessive stress level. Stress, according to Scully (1980), is ever present. Stressors, while they may be reduced, can never be

eliminated. Selye (1956, 1974) states that stress cannot be avoided, nor should it be. He points out that stress can be a positive, motivating force which is necessary for survival. Too much stress, though, will result in damage to the individual as manifested by diminished physical or emotional functioning.

If stress cannot or, indeed, should not be eliminated, methods which help the individual to deal with stress in order to mitigate its potentially harmful effects should be sought. Exercise may be one method to help minimize the negative impact of stress.

After the Stanford study (Bailey, Steffen, & Grant, 1980) identified the stressors of some 1800 intensive care nurses across the United States, a program to deal with these stressors was developed. The stress management program (Bailey, Walker, & Madsen, 1980) included a module on exercise to help cope with the stressors of physical and mental fatigue. Selye (1974) also promotes exercise as a technique of value in dealing with stress.

Exercise is important in that it enables one to become fit and to maintain this state of physical fitness. Fitness may enable one to resist the harmful effects of stress. This research was a study of the stress levels experienced by fit and non-fit registered nurses.

For the purpose of this study, the concept of stress was synonymous to stress as defined by Selye (1956, 1974). According to Selye, stress is the total nonspecific response of the body to any demand made upon it. Stress exists within the individual, it is the individual's response to perceived demands in his environment. A stressor is anything, physical or mental, that generates a stress reaction. In his pioneering work on stress, Selye (1956) describes the stress response to consist of three stages:

1. The alarm reaction. At this stage one is aware of a stressor.
 2. The stage of resistance. Defenses are mobilized to fend off the stressor.
 3. The stage of exhaustion. If stages 1 and 2 are not successful, a degree of exhaustion follows and functioning is impaired.
- Everyone goes through stages 1 and 2 many times. Stress is encountered, adjustments are made, and the individual adapts to the stressor. It is stage 3 that must be avoided. This stage represents the harmful effects of stress. Methods which the individual can undertake which will enable one to resist the damaging effects of excess stress will be beneficial in the quest for a healthy life.

This research has explored fitness that may buffer the negative outcomes of stress. Stress was measured by the

Health Problems Inventory (Jones 1988), a self-administered questionnaire. An interval level of data has resulted from scoring each form. This score then represents the individual's level of stress.

Aerobic exercise is required to achieve fitness. Therefore, exercise was defined as aerobic exercise in this study. Cooper (1982) defines aerobic exercise as that which requires oxygen for prolonged periods and places such demands upon the body that it is required to increase its ability to use oxygen. In order to obtain benefits from exercise, Cooper (1982) states that the individual must maintain a sufficiently high heart rate for minimum period of time. He advocates the use of the target heart rate as the goal. To obtain the target heart rate, the predicted maximal heart rate must first be determined. For women, 220 minus the age, is used. The target heart rate, then is 80% of the predicted maximal rate. The calculation for a woman aged 40 is as follows: $220 \text{ minus } 40 = 180$, $180 \times .80 = 144$. So the target heart rate for a 40-year-old female is 144. If this person exercises to the extent that the heart rate is at 144 for 20 minutes, four times each week, full aerobic benefits are achieved. The same benefits may be obtained by aerobic exercise for 45 minutes, three times per week. Aerobic exercise, which involves the repetitive use of major muscle groups includes such activities as swimming, jogging,

walking, aerobic dance, and jumping rope. According to Cooper (1982), it can be any activity that maintains the target heart rate for the required period of time.

Aerobic fitness is characterized by a high degree of efficiency by one's cardiovascular system. The American College of Sports Medicine (1986) has made recommendations for developing and maintaining such fitness. The type of exercise may be any that is rhythmical and aerobic in nature and that uses large muscle groups. The intensity should be 65%-90% of maximal heart rate. The duration, which varies with the intensity, should range from 15 to 60 minutes. Frequency must be 3 to 5 days per week. Individuals who engage in the appropriate type, intensity, duration, and frequency of exercise may be considered to be physically fit.

In this study, a point system developed by Cooper (1977, 1984) was used to determine fitness. Points were assigned according to the intensity, frequency, and time spent in the exercise each week. Subjects who obtained 27 points per week were considered to be physically fit (Cooper, 1984).

ASSUMPTIONS AND LIMITATIONS

For the purposes of this study, the following assumptions were made:

1. The practice of nursing is inherently stressful. The work environments cannot be structured to avoid the problem of excess stress for nurses.
2. Stress levels in individuals are the result of their total interaction with their environment. Stress is generated through activities of one's personal as well as one's professional life.

This study had the following limitations:

1. The subjects were nurses who were currently employed at one of the largest acute care hospitals in a midsized Midwestern city. Thus, it was to be a sample of convenience. Because convenience, not random, sampling was used, the results of the research are subject to internal and external validity concerns. In this study, the findings will be applied only to the nurses in the setting from which the subjects were selected. It is possible that the subjects selected for this study are not typical of the overall nurse population. Also, since random selection was not used, the composition of the groups may not be equal. Demographic variables will be displayed for each group, however.

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2. If exercisers are less stressed, the difference may be related to perceived support obtained from others because of participation in an exercise program. Allanach (1988) suggests that social support may reduce stress in nurses. Social support, since it will not be measured or controlled for, may be a confounding variable in this research.

3. Because of fiscal and time limitations, self-report methods of assessing stress and fitness were employed. Self-report mechanisms are subject to validity and accuracy questions. It has been assumed that subjects would respond to questions accurately and honestly.

4. The determination of individuals judged to be fit was made by evaluating responses to a questionnaire. Brooks (1987) points out that respondents may overestimate their level of exercise because of a social desirability bias. They may report behavior that they perceive as desirable rather than their actual behavior. Therefore, subjects may be erroneously placed in the fit group.

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RESEARCH HYPOTHESES

Based upon the conclusion of Selye (1974) that exercise is a technique of value in dealing with stress, the general perception that fitness helps to reduce stress (De Benedette 1989), and other findings reported in the literature, the following hypotheses were tested:

Ha 1. Nurses who exercise to the point of becoming fit and maintain such fitness will have a significantly lower level of stress than nurses who are not fit.

Ha 2. Critical care nurses will have significantly different stress levels than non-critical care nurses.

Ha 3. Younger nurses will have significantly higher stress levels than older nurses.

Ha 4. Nurses from different basic educational backgrounds will have significantly different stress level.

Ha 5. Nurses perceptions of their level of fitness will be significantly different than that determined through analysis of their exercise history.

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SIGNIFICANCE

The purpose of this research study was to determine whether there is a relationship between fitness and lowered stress levels in registered nurses. The literature review will disclose some undesirable effects of increased stress such as dissatisfaction, turnover, burnout, absenteeism, and both psychological and physical symptoms. If fitness can be associated with lowered stress levels, perhaps the negative effects of stress, which is inherent in nursing, can be mitigated.

There may be implications for the recruitment and retention of nurses. More satisfied, less stressed nurses may be more likely to stay, and turnover may be reduced. Recruitment may be easier for facilities with established exercise programs. Nurses may be attracted to facilities that value health promotional activities. Agencies that make exercise programs accessible to the nurse are likely to be viewed favorably by the health-conscious nurse in the job market.

In an editorial, Fielding (1988) writes about the potential of programs that can influence the areas of recruitment, productivity, and retention. This is where health promotional activities, he feels, may have their greatest value. He calls for more research in this area.

Finally, the success of any health care facility depends, to a large extent, upon the qualities of the nurses who interact with the patient and the family. Consumers may not be able to evaluate the effectiveness of the technology available to them, but they can judge the quality of the human interaction between themselves and the nurse. Excessively stressed nurses may be anxious, confused, and irritable (Tedesco-Carreras, 1988). Such nurses may not interact favorably with clients. A nursing staff possessing reduced stress levels could lead to increased client satisfaction and a more favorable image for the institution in the community.

LITERATURE REVIEW

Selye (1956, 1974), through his research regarding the concept of stress at the University of Montreal, provides the theoretical basis for this research. A physician-researcher, Selye was originally engaged in the study of sex hormones. After injecting various substances into rats, Selye found that certain changes in the adrenal cortex, the lymphatic system, as well as stomach ulcers resulted in these animals regardless of what foreign material was injected. Subsequently, he conducted other experiments with a variety of animals in which they were subjected to various stressors such as heat, cold, and noise, as well as the injection of foreign substances. The same triad of changes in the adrenal cortex, lymphatics, and gastric mucosa

resulted. From this work, Selye concluded that these changes were the result of a single nonspecific reaction of the body to any insult. Furthermore, the body responds in the same way to both physical and psychological stressors.

Further study led Selye to postulate the mechanism of this reaction. The nervous system senses the presence of a stressor. The hypothalamus is then stimulated by the nervous system. In turn, the hypothalamus stimulates certain endocrine glands, which results in the release of adaptive hormones such as cortisone and aldosterone. The release of these hormones provides a source of energy for the body to adapt itself to the demands made by the stressor (Selye, 1956, 1974).

Stress, according to Selye (1956), is the nonspecific reaction of the body to any demand that is made upon it. There are both good and bad varieties of stress according to Selye. The unpleasant or harmful stress he terms "distress." The positive or pleasant stress is "eustress" (Selye, 1974, p. 74). Eustress and distress cause the same nonspecific response. However, eustress, such as a kiss, causes much less damage. It is one's ability to cope with the demands in one's life, not the quality or the intensity of the stressor, however, that determines the effect of the stressor. This is why methods that enable one to cope with stressors are so vital.

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The total response of the organism to a stressor is termed the General Adaptation Syndrome (Selye, 1956). This syndrome consists of three stages:

1. The alarm reaction. At this stage the organism is aware of a stressor. It represents a general call to arms of the body's defensive forces.

2. The stage of resistance. Here the organism mobilizes its defenses to resist the threat of the stressor. The body adapts to the challenge and resists it. Selye (1974) states that the body has a finite amount of adaption energy which it uses to combat the stressor.

3. The stage of exhaustion. If the stages of alarm and resistance are not successful, a stage of exhaustion ensues.

Stress is not necessarily bad, nor should it be avoided. Selye (1956) points out that stress can be a positive, motivating force that is necessary for survival and well-being. The stress generated from crossing a busy intersection, for example, helps one to avoid becoming a traffic-accident victim. It keeps one on one's toes. Stress is a part of life; it results from interaction with the environment. It can provide the stimulus for achievement, or it can result in illness and incapacitation.

The same stress that can cause one person to become sick may be a positive motivator for another. One needs to

be able to deal with stress. In order to function successfully, individuals need to be able to resist and to adapt themselves to stress. The secret of health, according to Selye (1956), lies in the successful adaption to one's environment.

Everyone goes through stages 1 and 2 of the General Adaptation Syndrome many times. Stressors, which may be physical or mental, alarm the individual, but one adapts to them. But if the stressor is too great and/or one's capacity to resist is not sufficient, ill effects may result, and the ability to function becomes impaired (Selye, 1956).

In the first edition of his pioneering book, The Stress of Life published in 1956, Selye (p. 247) states that stress is an abstraction which cannot be perceived. It can be appraised, however, by the measurable changes which are produced in the body. Stress results in wear and tear on the body, the effects of which can be assessed. Some of these signs are physical in nature; others are psychological. Measurement of the physical results of stress may be done through physiologic measurements such as the recording of blood pressure, pulse, hormonal levels, and galvanic skin responses. Psychologic signs of the results of stress may be appraised through interviews and questionnaires.

By the time the second edition of this work was published (Selye, 1974), a list of 31 signs of stress had been developed (Appendix 1). These signs, according to Selye, are most important because they may be observed by the individual. He advises that persons monitor themselves for the appearance of these signs. The appearance of these signs should lead one to change one's activities or to practice deviation. Deviation is the process of turning something aside from its course. This is especially important with mental stress. Exercise, which itself is a stressor, can be an effective deviator. It can serve to reduce the harmful effects of a stressor by decentralizing it and generalizing its effects throughout the body.

In his role as a physician-researcher, Selye has performed over 1000 autopsies. He writes that he has never seen a person who has died of old age. To die of old age would mean that all of the body systems have worn out. This doesn't happen. Instead, one part wears out first which results in the disruption of the entire system. Deviation methods, such as exercise, may equalize the wear and tear throughout the body, thereby taking the pressure off of one overstressed part (Selye, 1974).

The concluding chapter of Selye's original book is entitled "The Road Ahead: (Selye, 1956, p. 303). In this section, which gives direction to future research, Selye

calls for work in the area of adaptation energy. Adaptation energy enables us to combat stress. When our adaptation energy is consumed, exhaustion follows. Selye believes that while there is a finite amount of this adaptation energy, perhaps it can be regenerated if not totally depleted. Or perhaps adaptation energy can be used more efficiently so that one's supply could last longer. A balance of zero adaptation energy means failure of a body part or total body failure, which is death. Even if the supply of adaptation energy is adequate, illness may still result. Although the body's reaction to the stressor is meant to be helpful in dealing with the situation, the mechanism doesn't work perfectly. For example, a common reaction to a stressor is a rise in blood pressure. This may be helpful but may result in hypertension and increased wear and tear on the body if it persists (Selye, 1956).

Excessive stress does take its toll. Selye (1965) wrote that many common illnesses are largely due to our adaptive reaction to stress. He concluded that emotional illness, hypertension, ulcers, and certain types of rheumatic, allergic, cardiovascular, and renal diseases are diseases of adaptation to stress. More than 50% of all illnesses are believed to be stress-related (Selye & Smith, 1974). These stress-related diseases are said to be increasing.

A study by Packard and Motowildo (1987) of 366 registered and licensed practical nurses at five hospitals in an eastern state was performed to assess stress, job satisfaction, and job performance. The investigators found that stress results in negative affective states such as hostility, anxiety, and depression. Consequences are lower job satisfaction and lower job-performance ratings. MacNeil and Weisz (1987) studied 190 registered nurses from critical and non-critical care units in a large teaching hospital in Canada. Non-critical nurses were significantly more stressed than critical care nurses ($t=3.21$; $p<0.002$). Non-ICU nurses averaged 16.4 hours of absence per month. Less-stressed critical care nurses averaged 8.7 hours of absence per month. This represents a significant difference in absenteeism ($t=12.20$; $p<0.001$).

Wolfgang, Perri, and Wolfgang (1988) studied job-related stress in hospital pharmacists and nurses. Responses to a mailed survey assessing stress and career satisfaction were obtained from 263 nurses and 107 pharmacists. Hospital nurses reported significantly more job stress than did pharmacists ($t=4.178$; $p<0.001$). Job dissatisfaction was expressed by 36.7% of the nurses who voiced some degree of reluctance about selecting nursing if they could reconsider their career choice. The authors

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report that the higher stressed nurses were significantly more dissatisfied ($F=8.38$; $p<0.001$).

Burnout is defined by Albrecht (1982) as a condition of mental and physical exhaustion caused by excessive stress. Burnout is similar to that which Selye (1956) terms the exhaustion stage, the third and final stage of the General Adaptation Syndrome. Symptoms of burnout include withdrawal, rigidity, blame and resentment, cynicism, griping, apathy, and task avoidance (Bargagliotti and Trygstad, 1987). These authors report that interpersonal problems with colleagues are a common manifestation of burnout. Lobb and Reid (1987) link burnout to higher turnover, increased absenteeism, and decreased productivity. Research conducted by McCranie, Lambert, and Lambert (1987) with 107 registered nurses measured burnout and stress. This study demonstrated a significant positive correlation between burnout and job stress ($r= 0.92$; $p<0.05$). Selye (1974) has written that stress is the spice of life. It is stimulating and makes life interesting. Indeed, it is necessary for survival. The previously cited literature, however, points out that too much stress can result in negative outcomes for both the individual nurse and the employer.

It was stated earlier that stress is the reaction of the individual to perceived stressors in the environment.

Many studies have attempted to determine what nurses perceive as stressors in their work environments.

Bilodeau (1973) identified five broad categories of frustrations for nurses: the patients and their care, personnel, environment, families and others. Oskins (1979) surveyed 79 critical care nurses employed in five acute care hospitals. The top stressors were the patient, the ICU unit, the patient's family, administration, ICU personnel, and the ICU nurses. Jacobson (1978) asked 87 nurses from seven neonatal intensive care units in three states to describe the three most stressful events they had experienced recently. Jacobson then categorized the responses. Most stressful were the nurse's own emotional feelings, doctor-nurse problems, understaffing, and nurse-nurse problems. Bailey, Steffen, and Grout (1980) obtained data on the stressors of more than 1800 nurses from local (San Francisco), regional (Bay area), and national (American Association of Critical Nurses) sources. The top three stressors identified were management of the unit, interpersonal relationships, and patient care. Researchers Keane et al. (1985) found that heavy patient load, work hours, and interference from physicians were the three major stressors in their study of 96 nurses who worked in a variety of intensive and non-intensive care units at a large university hospital.

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In Australia, Kelly and Cross (1985) queried 41 intensive care unit nurses and 61 medical-surgical nurses to identify stress factors in two large urban teaching hospitals. Major stressors were isolated including inadequate staffing and patient care needs. Working relationships with unit staff were the principle stressors located by Trygstad (1986) in her study of 22 nurses working in psychiatric settings in three private and one governmental hospital. Conflict with physicians, patients, and self were other major stress generators. Examples of problems with self include conflict between personal values and those required by the nurse role, as well as self-doubt.

Lobb and Reid (1987) studied stressors among 107 staff and middle management nurses in a tertiary care setting. Major stressors were heavy workload, insufficient resources, unpredictable staffing, scheduling, exposure to death and dying, and frequent crisis situations. Finally, stress of nurse executives in Los Angeles County was investigated by Scalzi (1988). In this study 75 (60%) of 124 top level hospital nurse managers responded to questions about their stress factors. The nurse executive group reported overload (too many or conflicting demands), quality of care concerns, role conflict, and role ambiguity as principal stressors.

It appears evident that nurses in a wide variety of clinical roles and settings encounter stressors from a wide

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array of sources. Most of these stressors are items that cannot be eliminated from the work setting. Obviously, patients, co-workers, physicians, the environment, and emergencies are a part of the profession of nursing. While efforts to identify and reduce stressors should continue to be made, such efforts alone cannot be effective in maintaining acceptable levels of stress. Efforts by persons to deal with their stress must be undertaken as well.

Bailey, Walker, and Madsen (1980) designed a stress management program in response to the Stress Audit results of Bailey, Steffen, and Grout (1980). Training modules were developed to deal with the specific stressors which had been identified by the audit. One module, developed to address the stressors of physical and mental fatigue, included exercise. While no report of the effectiveness of this program is provided, the inclusion of exercise provides an example of the general perception that exercise is helpful in combating stress in the nursing population.

The concept of social support has been investigated as a means of reducing stress. Social support is having someone available and willing to talk about problems. MacNeil and Weisz (1987) found a significant negative correlation between the level of social support and psychological stress scores ($r=-0.216$; $p<0.002$). They also found a significant negative correlation with self-efficacy

and stress ($r=-0.555$; $p<0.001$). Trygstad (1986) reported that staff nurses found co-workers and head nurses to be their greatest sources of support as well as their greatest sources of stress. Norbeck (1985) found only a slight effect of support upon job stress. Single nurses received more support from friends; married ones got more from relatives. Allanach (1988) points out that nurses should be advocates for each other. Nurse executives report coping strategies using support networks of both professional and outside interest groups (Scalzi, 1988).

Other studies concerning the coping behaviors of nurses are provided by Oskins (1979) and Kelly and Cross (1985) who presented nurses with similar lists of 20 coping mechanisms. The three most popular selections in both groups of ICU and non-ICU nurses were "I take action based upon present understanding," "I draw upon past experiences," and "I talk it out." Although crying, eating, sleeping, and using medications were possible choices, exercise was not an option provided. Studies such as these are deficient in that the exercise-stress relationship is not explored. These studies demonstrate the need for research that addresses this area.

There has been some work completed in the area of stress resistance. Some individuals seem to be unaffected by the rigors of stressors. Kobasa, Maddi, and Kahn (1982)

have proposed that hardiness qualities in certain people function to reduce results of stressful effects. According to Kobasa et al. (1982), hardiness is comprised of commitment, control, and challenge. The authors define commitment as the tendency to involve oneself in one's work. Control is the inclination to feel and act as if one is able to influence his or her environment. Challenge is the perception that change is good and is stimulating to growth. A study of 670 utility company management men was conducted annually for 3 years (Kobasa et al. 1982). Stress, hardiness, and physical and mental symptoms were surveyed by mail. Although the return rate was high, year 2=80% and year 3=78%, incomplete responses resulted in a final sample of 259 (39%). The study found that stressful life events are associated with increases in symptoms with a positive correlation between stressful events and illness ($r=.24$; $p<0.025$). Hardiness, however, decreases the likelihood of symptom onset. Although the researchers do not know how hardiness develops, they suggest that hardy persons may be those who engage in healthful practices such as proper diet, adequate rest, and exercise (Kobasa et al. 1982).

Keane et al. (1985) applied the work of Kobasa et al. (1982) to a population of 96 nurses employed in critical and non-critical care units in a large university hospital. They found that an increase in the hardiness score was

associated with lower levels of burnout ($p < 0.01$). In addition, these researchers found that older nurses were less stressed than younger ones ($p < 0.05$) and that baccalaureate nurses were more stressed than diploma nurses.

Further application of the hardiness constellation was carried out by McCranie et al. (1987). They studied a sample of 107 nurses assigned to ICU and non-ICU units located in a large community hospital. Hardiness, stress, and burnout were measured. Burnout scores were not significantly associated with age, years of nursing, marital status, type of nursing education, or clinical setting. Consistent with the earlier results, less hardy nurses experienced significantly higher levels of burnout ($p < 0.01$).

Selye and Smith (1979) have identified three variables that influence one's resistance to stress. These variables are perception, conditioning factors, and coping mechanisms. Perceptions may be altered through conscious thinking and by removal of stressors from the environment. Conditioning factors that affect resistance include self-esteem, nutritional habits, and healthy life styles. Coping mechanisms consist of physiological and psychological behaviors and may be adaptive or maladaptive. Adaptive behaviors include talking about problems and ventilating one's feelings, diversional activities that distract attention from the problem, and physical activity that

utilizes energy created by the stress and thereby decreases anxiety. Examples of maladaptive behavior are alcohol and drug abuse, somatization, and bizarre behavior.

The relationship of exercise and fitness is not as well supported as are the negative outcomes of stress. O'Donnell and Ainsworth (1984) provide a substantial list of positive effects of exercise upon health. The list includes such stress reduction outcomes as improved ability to relax, less tension and less anxiety. The authors point out, however, that this represents claims of benefits from exercise; there is little, if any, scientific data to support these contentions. A review of research probing the linkage between exercise and stress was performed by De Benedette (1988). The author concludes that while fitness seems to reduce stress, researchers don't know how or how well it works.

Most of the research conducted to explore the effect of fitness and exercise upon stress has been conducted in the laboratory (Crews & Landers, 1987). Typically, fit and non-fit subjects are exposed to artificially induced psychological or physiological stressors, and their reactions are recorded.

Research completed by Holmes and Roth (1985) consisted of 10 highly fit and 10 low fit subjects being exposed to a psychological stressor, recall of digits backwards. The

stress response was measured physiologically by recording heart rate. Psychological stress response was also solicited through a series of questions regarding the subjects' feelings about the testing. The highly fit group experienced a significantly lower heart rate in response to the stressor. The mean pulse for the fit subjects was 83; the low fit group mean was 94 ($p < 0.08$). No significant difference between the groups in their subjective response to stress was evidenced.

Crews and Landers (1987) reviewed 34 studies that attempted to measure whether the response to acute psychological stressors in the laboratory was reduced among exercisers. There was a combined total of 102 measures used to generate stress. Half of these studies showed a difference between fit and unfit subjects, and half did not. Then the researchers used a meta-analytical technique for the purpose of combining the results of these independent studies. The combined results showed a reduced psychological stress response in aerobically fit subjects ($p < 0.01$). The authors point out that these studies represent laboratory studies using acute short-term stressors. The need for real life studies using individuals with more long-term stress was called for.

The influence of rest and exercise on anxiety and blood pressure was studied by Raglin and Morgan (1987). There

were 30 regular male exercisers who volunteered for the study. Both anxiety, measured by the State-Trait Anxiety Inventory ($p < 0.002$), and blood pressure ($p < 0.001$) were lowered from pre-exercise levels in the group following aerobic exercise. After rest, subjects had a significant blood pressure decrease ($p < 0.001$) but the lowering of anxiety was not significant ($p > 0.05$). In addition, the exercise related reduction in both anxiety and blood pressure was sustained for at least 2 hours. The rest-induced changes were sustained for only minutes. This study yields some interesting results, but only known exercisers were tested. Also, the sample was small, with only 15 subjects participating.

Sinyor, Schwartz, Peronnet, Brisson, and Serganian (1983) studied a sample of 30 paid college students. Half were heavily trained in aerobic activities, and half were not trained. All of the students were subjected to psychological stress in the form of three difficult tests that required rapid verbal responses. The trained group had a significantly lower resting mean heart rate (51 ± 1.9 , $p < 0.001$) than the untrained group (64 ± 2.4). Both groups showed marked elevations of heart rate during the testing. The trained group had a significantly more rapid recovery rate following the stressor exposure ($p < 0.005$). Sinyor, Golden, Steinert, and Serganian (1986) also reported faster

heart rate recovery following exposure to psychological stress ($p < 0.05$).

Four stressors, active and passive physical and active and passive psychological, were administered to subjects divided into four groups according to degree of fitness (Hull, Young, & Zeigler, 1984). Physical response to the various stressors included heart rate, blood pressure, epinephrine, and norepinephrine levels. Psychological response was measured by having subjects complete a mood checklist. These measurements were taken after each stressor exposure. Predictably, baseline heart rate was lower in fit subjects ($p < 0.01$). Fitness was not associated with any difference in blood pressure, although subjects over age 40 had higher blood pressure than younger ones (mean 132 ± 4 mm Hg and 121 ± 2.7 mm Hg, $p < 0.01$). Fitness was not associated with lower epinephrine or norepinephrine levels. All subjects showed elevated epinephrine to all stressors, which reinforces Selye's theory of stress (1956). The passive stressor, a film on industrial accidents, was associated with a significantly lower response in the more fit groups ($p < 0.05$) who showed less depression and anger after the film.

Wheeler and Frank (1988) studied the presence of qualities referred to as stress buffers which may affect an individual's ability to resist the harmful effects of

stress. A sample of 668 male and female subjects entering a health promotion program in two midwestern states were given a stress-impact questionnaire. The sample was then divided into a distressed and a stress-resistant group. Fourteen of the 22 variables investigated were found to be significant stress buffers ($p < 0.002$). Seven of these were determined to be strong buffers ($t = 14.73 - 8.15$). Seven were moderate buffers ($t = 6.18 - 3.30$). Exercise, with a t -test value of 4.38 was a moderate buffer.

Brooke and Long (1987), concerned with the limitations of artificially contrived stressors that are confined to the laboratory, studied the response of fit and non-fit subjects to a real life stressor. The stressor selected was the completion of a 15-meter rappel. No subjects had ever rappelled previously. The sample contained 9 fit and 9 non-fit healthy males. Heart rate, subjective anxiety, epinephrine, norepinephrine, and cortisol blood values were used to test the stress response. Levels were checked pre-stressor, immediately after rappelling, 15 minutes, and 30 minutes after rappelling. The only difference in the groups was in heart rate. The fit group exhibited an overall lower heart rate than the non-fit group ($p < 0.011$). This research, according to the authors, provides some support for the previous research (Sinyor et al. 1983, 1986; Holmes & Roth,

1985), which suggests that aerobic fitness is associated with greater coping ability.

There is a dearth of research examining the relationship of fitness to stress levels utilizing nurse subjects. Severtson and Bruya (1986) studied the effects of aerobic exercise and meditation upon electroencephalogram (EEG) patterns of student nurses. There was no change in EEG patterns. While stress levels, measured by the Stanford University stress level test, were lowered in both groups after 6 weeks of exercise or meditation, neither change was statistically significant. While of limited value because the findings were not significant and there were only five subjects per group, positive feelings about the value of exercise were expressed by the group.

In summary, the literature review suggests that exercise may be of value in reducing the effects of excessive stress. Little work was found to have been done with nurse subjects. The literature review also points out the need for research of long-term chronic stress. This research will be concerned with what may be termed pocket stress. Pocket stress is the type of stress that persons carry around with them every day. Stress is not bad unless there is too much of it or it is not dealt with appropriately. Then it may cause certain harmful effects.

This work will attempt to explore the relationship of exercise and fitness to the level of that stress which is carried around each day.

CHAPTER III

METHODOLOGY

The research question pursued in this study was, what is the relationship of fitness to the level of stress experienced by the nurse? In order to examine this relationship, two groups of nurses were studied. Fit and non-fit nurses had their stress levels measured by a previously developed questionnaire (Jones, 1988). Fitness status was determined through the use of an exercise history form. Use of this form resulted in the classification of the nurses into exerciser (fit) and non-exerciser (non-fit) groups. A descriptive ex post facto design was used in this research.

There were two groups of nurse subjects. One group consisted of physically fit nurses currently engaged in some form of aerobic exercise. These were nurses who exercised regularly for at least 6 weeks. They are referred to as the fit subjects. The other group consisted of registered nurses who were not currently engaged in aerobic exercise and had not previously been aerobic exercisers for at least 6 weeks. They are referred to as the non-fit subjects. The exercise status was determined by self-report using the exercise history portion of the Personal Data form.

An acute care hospital located in the Midwest provided the setting for this research. A referral hospital, this large urban facility is also engaged in the teaching of nursing, medical, and allied health care students. It is a private, not-for-profit hospital with a religious affiliation.

Subjects, selected at random using the cluster technique, included both full-time and part-time nurses employed at the facility. Both critical and non-critical care nurses were surveyed. Only female subjects were included in this research. Subjects were selected by placing nursing unit names in either a critical care or a non-critical care envelope. Unit names were then blindly drawn from each envelope. After the unit name was drawn, nurses assigned to that unit were invited to participate in the study. This process was repeated until a list containing a sufficient number of subjects had been obtained. Arrangements were made to include approximately 120 nurses in the study. Roughly equal numbers of critical care and non-critical care nurses were sought.

The designation of nursing units as either critical care or non-critical care has been made by senior nursing management at the medical center. In general, critical care units require nurses assigned there to have had classes in various monitoring techniques and provide care for clients

who are typically less stable than those in non-critical care units.

Participation in this research required the completion of a stress measurement questionnaire. In addition, exercise history and demographic data were solicited on the Personal Data form.

Subjects were assigned to fit or non-fit groups dependent upon their current level of exercise activity. The assignment to fit or non-fit was based upon the point system developed and described by Cooper (1977). In the book's appendix, Cooper lists common exercise activities. Points are assigned according to the frequency, time, and intensity of the activity (Cooper, 1977, pp. 228-252). The point value is associated with the energy expenditure of the various activity. Cooper states that fitness requires an expenditure of 30 points per week for men and 24 points for women. Since only women were studied, subjects who obtained 24 points per week were considered to be exercising to the extent of being fit.

Cooper's point system has been utilized by Sinyor et al. (1983). Brooks (1987) describes the use of a questionnaire to determine fitness based upon the frequency of participation in various activities.

According to Selye (1974), stress is a concept which cannot be measured. Its effects, however, can be detected

and measured. Therefore, stress can be measured by using indirect methods. There are two ways in which stress can be determined (Selye, 1974; Sinyor et al., 1986; and De Benedette, 1988). One approach involves the determination of physiologic changes which occur in the body. Such measurements include heart rate, blood pressure, galvanic skin response, and epinephrine and norepinephrine levels. The second method utilizes a self-report questionnaire to obtain the subjective effects of stress upon the individual. A questionnaire was used to assess stress in this study.

The survey instrument which was used to measure stress was the Health Problems Inventory (Jones, 1988). Jones has granted permission to this researcher to employ this tool (personal communication, November 29, 1989). Originally designed for administration to nursing students, the tool has been modified slightly, with the consent of the author, for use with the registered nurse. Several items which relate to the environment of a student such as "class," "learning," and "instructor," have been altered. This is a 64-item questionnaire which was self-administered. Each item consists of a statement to which the subject must respond by indicating if the statement applies to them: never (1), rarely (2), sometimes (3), often (4), or always (5). A copy of the HPI is attached (Appendix 2).

This tool was developed from statements solicited from sophomore, junior, and senior baccalaureate nursing students. A total of 487 students from eight schools located in six states responded to requests for a description of problems encountered in their program that adversely affected them. Faculty from seven schools then formed a panel of experts to review and revise the data. From their work a list of 83 items was compiled. Additional data from 58 nursing students was then obtained. Following the review of this data, the panel felt that no changes to this form were indicated. Content validity was thereby established (Jones, 1988).

Content validity was also addressed for this research. A panel of three human behavior experts has been consulted in order to support content validity for the HPI. The panel consisted of a psychiatrist in private practice, a school psychologist, and a psychologist in private practice. Each was sent a copy of the HPI along with a request to review the form with regard to its capacity to measure stress as defined for this study. All three provided the researcher with a statement that the HPI did have content validity.

Three experts in the field of fitness were contacted to evaluate content validity of the exercise history portion of the Personal Data form (Appendix 3). Those consulted included an exercise physiologist, a corporate wellness

director, and a sports medicine physician. Each of the three provided letters stating that the form could be used to determine the subjects state of fitness based upon Cooper's model (1982). Content validity was thereby established.

Originally, a test-retest design was used to gauge the reliability of the tool. The 83-item HPI was administered to senior nursing students and then readministered 1 week later. The split half technique and Cronbach's alpha were employed to determine internal consistency. Following this process, various items were deleted and the final version of the Health Problems Inventory was formed, consisting of 64 items. The Guttman Split-half reliability coefficient was 0.962029; the coefficient alpha was 0.96157 (Jones, 1988).

Reliability testing of the HPI with subjects who participated in this study was accomplished by using the Cronbach coefficient alpha. The value of the coefficient, using all 122 subjects in the final study, was 0.939359. Reliability of the Personal Data form was not addressed.

In addition to the Health Problems Inventory and the Personal Data form, several documents have been developed in order to implement this research. These support documents include a cover letter designed to inform subjects about the research and to solicit their participation (Appendix 4). An instruction sheet to guide the completion of the HPI was

constructed (Appendix 5). Since informed consent was required, a form to obtain consent was developed (Appendix 6). Finally, information regarding the subject's age, marital status, years of nursing experience, nursing education, and nursing unit was obtained. Also, nurses were requested to provide their perception of their current level of physical fitness. These data were collected on the Personal Data form (Appendix 3).

Prior to the final collection of data for this research, a pilot study was done. The primary purpose of the pilot was to obtain input from the subjects regarding the entire data collection process. Comments and suggestions obtained from the pilot study were then used to fine tune the stress-assessment tool (HPI), personal data form, and other aspects of the data collection process such as the length of time required to complete the forms.

Two nursing units, one a critical care unit and the other a non-critical care unit were sought for the pilot study. Relatively small units with a staff of fewer than 20 nurses were desired. A nursing executive at the hospital nominated the units, which were utilized after consent was obtained from the nurse managers of those units.

Input from pilot subjects was obtained through the use of a Pilot Study form (Appendix 7). This letter was distributed to the pilot subjects along with the HPI and

Personal Data forms. Completed forms were mailed back to the researcher in the addressed and stamped envelope which had been provided.

As a result of the pilot study, it was determined that several statements on HPI were ambiguous. These items were clarified and rewritten. In addition, the time requirements of participation in the research were ascertained.

After pilot study results were incorporated, plans were made to begin the major study. Initially, the researcher made contact with the nurse managers of the units selected to inform them about the research, to solicit their support, and to ask them to encourage their nurses to join the study. Arrangements were made to attend the regularly scheduled monthly unit meetings. Some units had one such meeting per month, others had two or three meetings. The research project was outlined and nurses were encouraged to join the study. Questions about participation were addressed.

Once nurses had been informed of this study, consent to participate in the research was obtained. A letter describing the research, a consent form, and a stamped, addressed envelope was distributed by the researcher to each full and part-time female nurse assigned to the unit. In cases where a nurse was not present at the unit meeting, the letter and consent form were distributed by the nurse manager.

After consent to proceed with the research had been obtained from subjects, materials were distributed to the participants. Each subject was given the following items:

1. Instruction sheet.
2. Health Problems Inventory.
3. Personal Data form.
4. An envelope with a stamp and an address label attached.

A packet containing these items was placed in each consenting nurse's unit mailbox.

Follow-up with subjects was based upon guidelines suggested by Dillman (1978). Letters requesting participation were sent to those nurses who had not returned their signed consent forms a week after unit presentations had been made. After consents had been obtained, a packet of materials was delivered to each participant's unit mailbox. One week after the distribution of the packets, letters were sent to each subject. The letters thanked them for their participation and also requested those who had not yet completed their surveys to do so within in the next week. An offer to provide additional materials, if they had been misplaced, was also made.

Efforts were made to guarantee that subjects' rights were protected. Initially, permission to proceed with the research was obtained from the Human Subjects Research

Review Committee at Drake University. Next, consent to proceed with the research was secured from the Research and Innovation Committee of the hospital. Finally, a signed informed consent form was gathered from each subject who participated in the study.

A specific consent form was developed for the subjects in this research. Information was provided regarding the purpose of the study and its importance. Criteria used to select subjects was shared with each subject. Participation in the study was encouraged, but individuals were informed that they need not participate. Results of the study will be mailed to those participants who indicated their desire to obtain them.

Individuals participating in the study were not harmed as a result of their involvement. A time expenditure of approximately 15 minutes was required for each subject. No financial expenditure was needed. Stamped envelopes were provided and collect phone calls were accepted from those who had questions.

Confidentiality for the subjects was addressed and assured. Subjects were unknown to the researcher. While subjects who indicated a willingness to participate signed the consent form, questionnaires did not contain names. Although the respondent's unit is known to the researcher,

only aggregate data (i.e. critical care or non-critical care) will be reported. Individual unit results will not be disclosed.

CHAPTER IV

ANALYSIS and RESULTS

The pilot study

The non-critical care unit had a staff of 14 full- and part-time nurses. A total of 9 (64%) returned signed consents indicating a willingness to participate in the research. There were 8 subjects (57%) who returned completed packets of the HPI, personal data form, and the comments form.

The critical care unit was staffed by 15 full- and part-time nurses. There were 9 (60%) signed consent forms returned. Completed packets of materials were received from 8 (53.3%) subjects.

In summary, the pilot sample contained 29 potential subjects from two nursing units. Signed consents were returned from 18 of the 29 (62%). The group of 18 was then provided with a packet of materials which contained the HPI, personal data form, comment form, and a stamped, preaddressed envelope. A total of 16 (55%) subjects mailed their completed forms to the researcher.

Of the 16 subjects in the pilot group, 3 (18.8%) were determined by the researcher to be physically fit. The remaining 13 subjects (81.2%) were judged to be not fit. A total of 4 subjects (25%) perceived themselves to be

physically fit and 12 (75%) had the perception that they were not fit. Because of the small number of subjects and the correspondingly low numbers in each category, statistical analysis of the data was determined to be not feasible.

Subjects provided information regarding the amount of time required to complete the forms. Most of the nurses indicated that the personal data form took less than 5 minutes to complete. The mean time, however, was 6 minutes. The Health Problems Inventory completion time varied from 5 to 30 minutes. The mean time was 16 minutes.

It was noted that 3 subjects (18.8%) did not provide their names on the personal data form although the forms were structured to do so by having a line calling for the participant's name. Because of this, it was felt that some subjects did not wish to be identified. Therefore, the line asking for the name was deleted on the personal data form. Also following the pilot study, another variable, employment status, was added. A line was added requesting that the subjects indicate whether they were full- or part-time.

A description of the pilot sample is shown in Table 1.

Table 1 DEMOGRAPHIC VARIABLES PILOT (N=16)

Variable	Frequency	Per cent
=====		
Marital		
Single	7	43.7
Married	8	50.
Divorced	1	6.2
Nursing Unit		
Critical care	8	50
Non-critical	8	50
RN Experience		
< 1 yr	2	12.5
1-2 yr	1	6.2
3-4 yr	6	37.5
5-6 yr	2	12.5
> 7 yr	5	31.3
Hospital Exp (Data missing= 1)		
< 1 yr	2	13.3
1-2 yr	5	33.3
3-4 yr	2	13.3
5-6 yr	2	13.3
> 7 yr	4	26.7
Education (Data missing= 2)		
Diploma	11	78.6
ADN	1	7.1
BSN	1	7.1
Basic+ BSN	1	7.1
Age		
< 25	6	37.5
26-30	4	25
31-35	4	25
36-40	0	0
> 41	2	12.5
Actual Fitness		
Fit	3	18.8
Not fit	13	81.2
Perceived Fitness		
Perceived fit	4	25
Perc not fit	12	75

The major study

Plans were made to obtain approximately 120 nurse subjects for this research. The sample was to be comprised of roughly equal numbers of nurses from critical and non-critical care units. The designation of a unit as either critical care or non-critical care as made by a senior nursing official at the facility. While the designation of a nursing unit as either critical care or not is usually an easy decision, it may be controversial. In this research, the decision to exclude a unit was made because of a disagreement over the designation of the unit. The nursing administrator considered the unit to be non-critical care but the nurse manager thought the unit was a critical care area. This unit was not used in the research, with the agreement of the nurse manager, because the dispute may have altered responses as well as the extent of participation.

There were three critical care units, staffed by 131 nurses, and six non-critical care units, which had 122 nurses assigned, used to obtain subjects for the study. Units were selected blindly until a pool of roughly 250 nurses was obtained. The number of potential subjects totaled 253. Signed consents were received from 153 (60.5%) individuals who indicated that they would participate in this study. Ultimately, 126 (49.8%) subjects returned their completed forms to the researcher. Responses from three

potential participants were received after the data had been submitted for statistical analysis and therefore were not used. The final sample consisted of 122 subjects or 48.2% of those invited to participate.

In the pilot sample there were 16 participants. Although there were equal numbers of 8 from each type of unit, only 3 (18.8%) of the 16 were physically fit. In the research group, 32 (26.2%) of the 122 were fit. A description of the sample is shown in Table 2.

Table 2 DEMOGRAPHIC VARIABLES (N=122)

Variable	Frequency	Percent	(Pilot %)
=====			
Marital			
Single	39	32	(43.8)
Married	72	59	(50.)
Divorced	10	8.2	(6.2)
Separated	1	0.8	---
Nursing Unit			
Critical care	69	56.6	(50.)
Non-critical	45	36.8	(50.)
Data missing	8	6.6	
RN Experience			
< 1 yr	10	8.2	(12.5)
1-2 yr	12	9.8	(6.2)
3-4 yr	22	18	(37.5)
5-6 yr	15	12.3	(12.5)
> 7 yr	63	51.6	(31.3)
Hospital Exp (Data missing= 1)			
< 1 yr	16	13.2	(13.3)
1-2 yr	31	25.6	(33.3)
3-4 yr	25	20.7	(13.3)
5-6 yr	7	5.8	(13.3)
> 7 yr	42	34.7	(26.7)
Education			
Diploma	56	45.9	(78.6)
ADN	28	23.	(7.1)
BSN	21	17.2	(7.1)
Basic+ BSN	10	8.2	(7.1)
Basic+ other BS	7	5.7	---
Age			
< 25 yr	7	5.7	(37.5)
26-30 yr	35	28.7	(25.)
31-35 yr	41	33.6	(25.)
36-40 yr	19	15.6	---
> 41 yr	20	16.4	(12.5)

Table 2 (Cont)

DEMOGRAPHIC VARIABLES

Variable	Frequency	Percent	(Pilot %)
=====			
Actual Fitness			
Fit	32	26.2	(18.8)
Not fit	90	73.8	(81.2)
Perceived fit			
Fit	41	33.6	(25.)
Not fit	81	66.4	(75.)
Employment Status			
Full-time	89	73	---
Part-time	33	27	---

Descriptive and inferential statistics were analyzed based upon the mean response per statement on the Health Problems Inventory. The potential score per statement varied from a low score of 1 (Never), to a high score of 5 (Always) on the stress questionnaire. The mean score of all statements in this study was 2.576. The median value was 2.570. The mode was found to be 2.672. Calculation of the range yielded a value of 2.386. The standard deviation was 0.858.

A frequency polygon illustrates the frequency of the mean stress score per statement for each participant. This information is displayed in Table 3.

Table 3 DISTRIBUTION of MEAN SCORES (N=122)

Frequency

```

40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0//*****-*****-*****-*****-*****-*****-*****-*****-*****-*****//5
1.25 1.51 1.76 2.01 2.26 2.51 2.76 3.01 3.26 3.51
/ / / / / / / / / /
1.50 1.75 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75

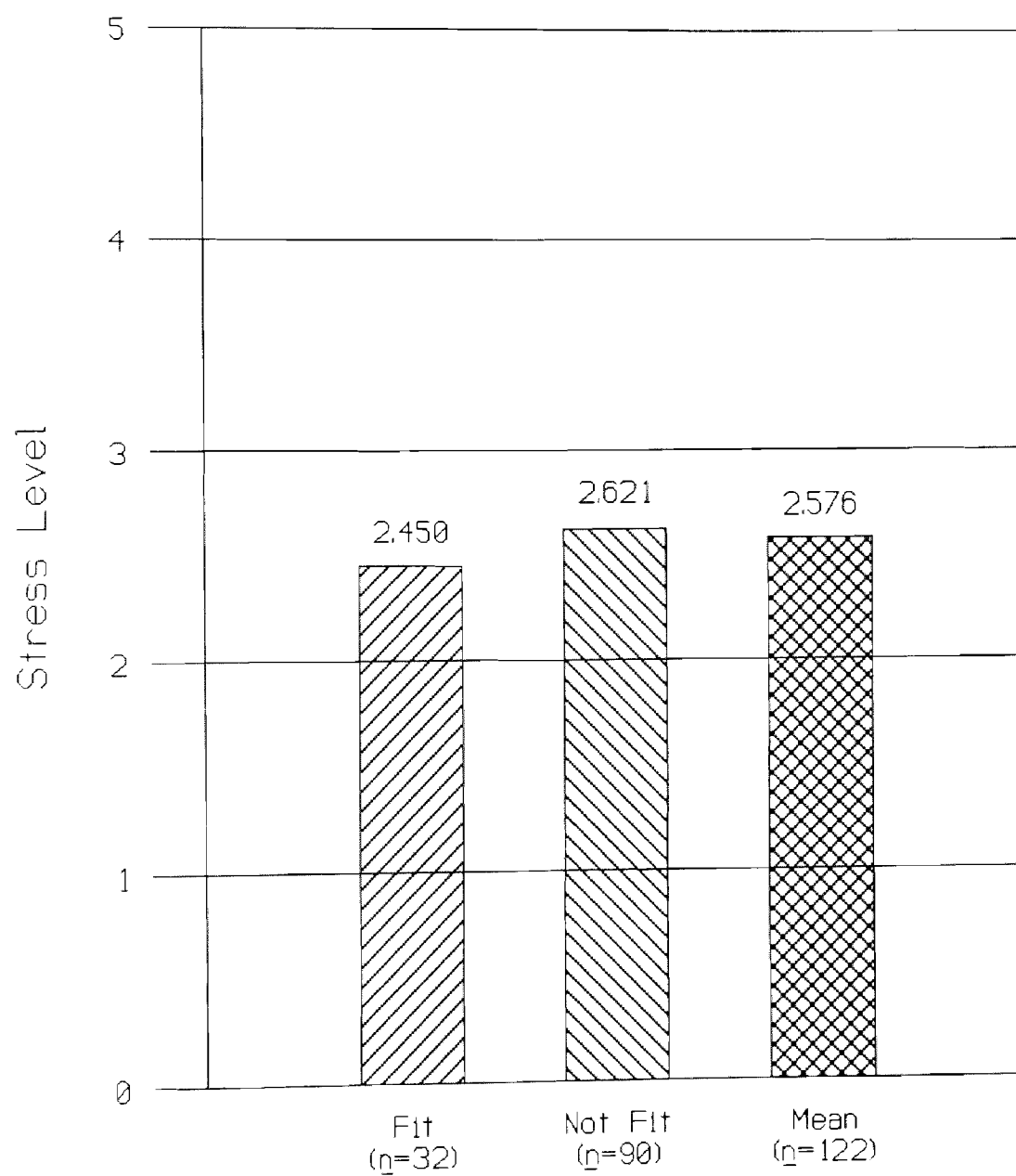
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Reliability testing of the Health Problems Inventory was performed by applying the Cronbach coefficient alpha. The value of the coefficient alpha was 0.9394. There were 8 statements of the 64 items that had a correlation with the total of less than 0.30.

Hypothesis testing was done by running analysis of variance procedures twice. Initially, ANOVAs were run on all 64 items of the HPI. Then ANOVAs were rerun on 56 items, with the 8 statements removed which were found to be objectionable after running the coefficient alpha. The level of significance selected for this research was 0.05.

Hypothesis 1. Nurses who exercise to the point of becoming fit and maintain fitness will have a significantly lower level of stress than nurses who are not fit. The ANOVA done on all 64 statements has an F value of 3.15, ($p=0.0787$), degrees of freedom=121. When the analysis is performed on the 56 item questionnaire, the F value is 4.17, ($p=0.0434$). The Cronbach's alpha pointed out that there were 8 statements in the HPI which, for whatever reason, did not correlate well with the other items in the stress-assessment tool. Therefore, using the results based on the shortened 56-item tool, the null hypothesis is rejected and Hypothesis is supported. All subsequent hypothesis testing was done using the revised HPI consisting of 56 items. The stress scores of fit and non-fit subjects are displayed in

Table 4

Stress Level v.
Fitness

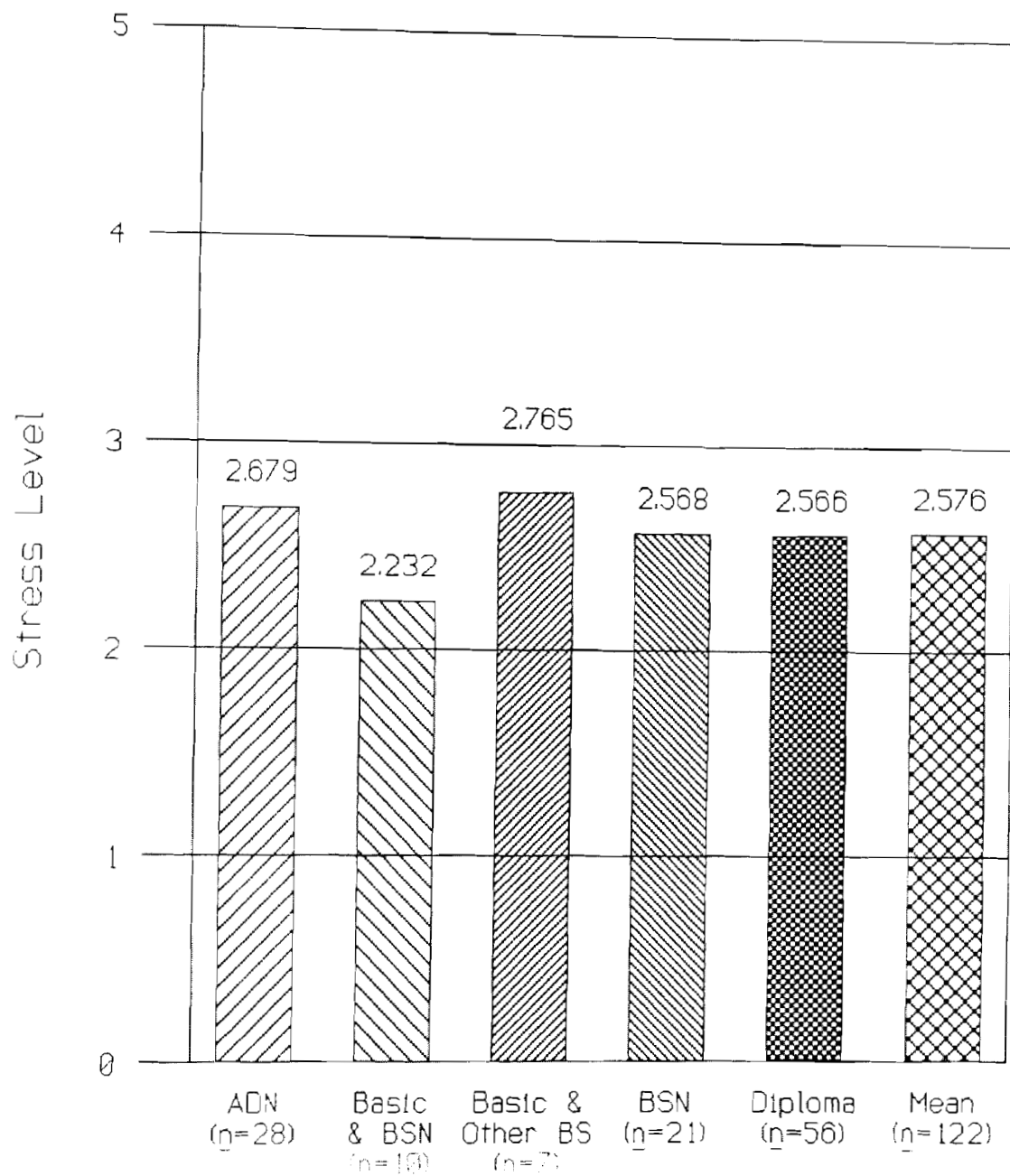
Hypothesis 2. Critical care nurses will have significantly different levels of stress than that of non-critical care nurses. The value of F was 0.53 ($p=0.4680$), degrees of freedom=113. Therefore, the null hypothesis was not rejected.

Hypothesis 3. Younger nurses will have significantly higher levels of stress than older nurses. The value of F was 1.74, ($p=0.1468$), degrees of freedom=121. Therefore, the null hypothesis was not rejected. In this study, there is no statistically significant relationship between the age of the nurse and levels of stress.

Hypothesis 4. Nurses with different nursing educational backgrounds will have significantly different stress levels. The value of F is 2.76, ($p=0.0331$), degrees of freedom=121. Therefore, the null is rejected and this hypothesis is supported. A post hoc procedure, the least significant difference (LSD), was used to determine where the difference between the groups occurred (Snedecor & Cochran, 1967). The LSD technique showed that the basic + BSN group is different. This group is significantly less stressed than the subjects from other educational backgrounds. These scores are illustrated in Table 5.

Table 5

Stress Level v. Educational Background



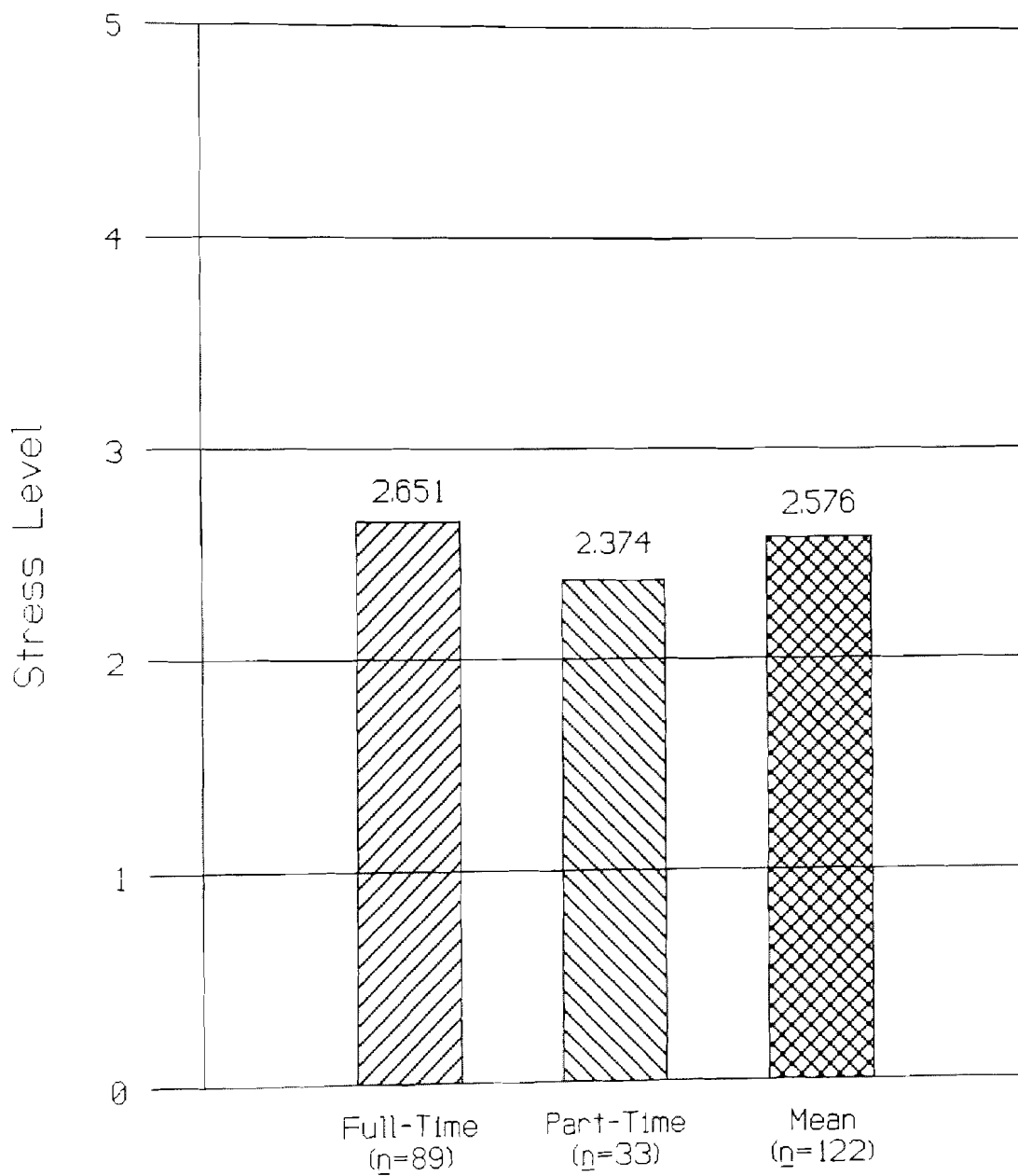
Hypothesis 5. The nurses' perception of their level of fitness will be significantly different than that determined through an analysis of their exercise history. Since this hypothesis concerns nonparametric data, the chi-square test was employed. The value of the chi-square was 17.388, ($p=0.000$), degree of freedom=1. Therefore, the null is rejected and this research hypothesis is supported.

The relationship of stress to other variables was examined as well. Stress levels and years of nursing experience, years of facility experience, marital status, and chronological age were explored. No significant differences were found when using ANOVAs to look at differences within each of these groups.

There were, however, two incidental findings that were statistically significant. When stress levels were determined based upon employment status, full-time or part-time, the difference was statistically significant. The F value was 11.99, ($p=0.0007$), degrees of freedom=121. Full-time nurses have significantly higher stress levels than part-time nurses experience. See Table 6.

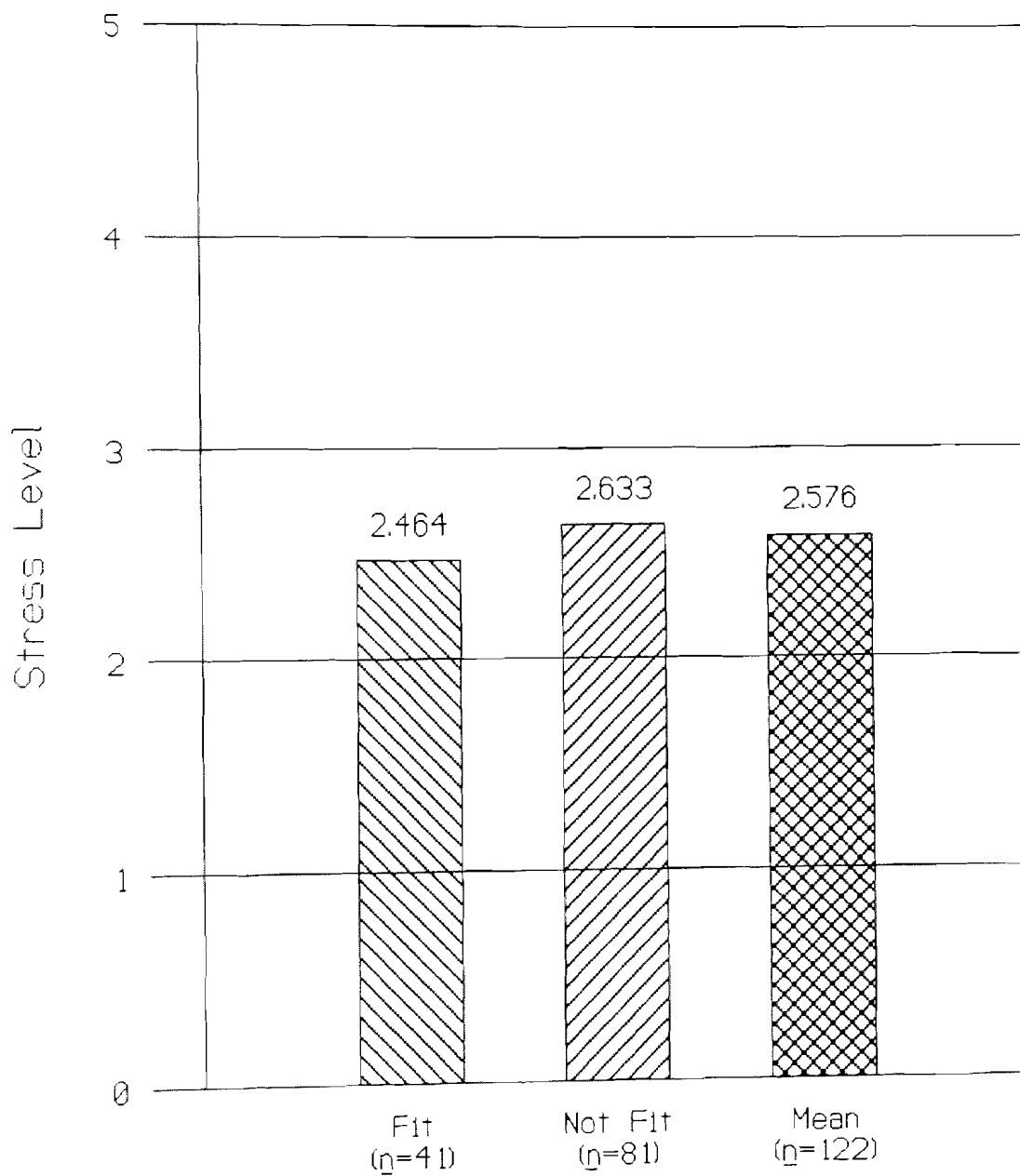
Table 6

Stress Level v.
Full-Time and Part-Time
Employment



Also examined were the stress levels of nurses who perceived themselves fit compared to those who considered themselves to be not fit. In this comparison, the F value is 4.78, ($p=0.0308$), degrees of freedom=121. Nurses who perceived themselves to be fit had a significantly lower level of stress than those who felt that they were not fit. See Table 7.

Table 7

Stress Level v.
Perception of Fitness

Perception of Fitness

CHAPTER 5

DISCUSSION

This research yielded three hypotheses and two incidental findings that were significant at the $p < .05$ level:

Hypothesis 1. Nurses who exercise their way to physical fitness and remain fit will have significantly less stress than nurses who are not fit.

Hypothesis 4. Nurses with different nursing education preparation will have different levels of stress.

Hypothesis 5. The nurse's perception of fitness will be different than the actual level of fitness.

Incidental finding 1. Full-time nurses have significantly higher stress levels than part-time nurses.

Incidental finding 2. Nurses who perceive that they are fit have a lower level of stress than nurses who feel that they are not physically fit.

The primary purpose of this research was to explore the exercise-induced fitness-stress relationship. This study supports that there is a relationship. Nurses in this sample who are physically fit did have a lower level of stress than non-fit nurses.

Earlier, it was stated that nursing is inherently stress producing. Dealing with life and death situations,

troubled clients, short staffing, rotating shifts, and frustrations with co-workers generate a great deal of stress. While stress is not necessarily bad, too much stress can cause excessive wear and tear. Impaired physical and/or psychological functioning may ensue.

Fitness among nurses can be promoted by informing them that fitness may help them to reduce their stress burden. Nurses need to become aware of this. Agencies can promote fitness among their nursing staffs by teaching them the benefits of becoming fit. On-site facilities for exercise should be provided. Offering exercise classes at times convenient for nurses working evening and night shifts would facilitate their participation. Individual exercise programs for those who can't join groups could be established. Fitness can further be encouraged through agency financial support of classes. Promotional items such as t-shirts, sweats, and head-bands can provide additional incentive to exercise. The addition of the agency's logo on these items can provide additional visibility in the community as well as provide the message that they are health promoters.

The results of testing Hypothesis 4 suggest that nurses who complete a basic nursing program and then go on to complete a Bachelor of Science in Nursing degree are significantly less stressed than nurses with other

educational backgrounds. This finding may have implications for BSN completion institutions. It may be that these programs somehow increase the ability to either resist stress or to deal with it effectively. Possibly, the additional education enables one to be more adaptable to one's environment. Perhaps perceptions are altered. Selye (1956) states that stress, which is the total nonspecific response of the body to any demand, is the individual's response to perceived demands in the environment. Perhaps the person with the BSN completion degree is better able to structure the environment in order to resist stress. There may be other factors present within this group that seemingly assist them to reduce stress. Further research with this group would be appropriate.

Finally, there are two significant findings in this research that deal with perception of fitness. More nurses in this study perceive themselves to be fit than actually are physically fit. This finding probably wasn't surprising. Brooks (1987) points out the social desirability of fitness and that persons tend to overstate their fitness.

The other, more important, finding is not merely that people tend to overstate their fitness, but that people in this study who perceive themselves as fit have significantly less stress than people who don't see themselves as fit.

Perception of fitness, as well as actual fitness, may be of value in controlling the stress burden.

Kobasa et al. (1982) studied the area of stress resistance. The constellation that they call hardiness is believed by this group to enable one to repel stress. Hardiness consists of the components of commitment, challenge, and control. The perception of fitness may enable one to have a sense of control. This feeling may enable one to feel as though one is able to influence the environment instead of being at the mercy of it. The perception of fitness may assist one to influence these forces rather than merely being at their mercy. This ability could reduce the stress of life.

This research addresses the relationship of stress levels in nurses with several different variables. Several variables were found not to be significantly related with stress levels. Marital status, type of nursing unit, years of nursing experience, years at the institution, and age of the nurse did not seem to be related to stress levels. Actual fitness, perception of fitness, basic plus BSN nursing education, and part-time employment were associated with significantly lower stress. The relationship of these four variables and a comparison with the whole sample is shown in Tables 8-11.

Table 8 Fit/Not Fit & Other Variables

Variable	Fit		Not Fit		Total	
	N	%	N	%	N	%
Frequency	32	26.2	90	73.8	122	100
Full-Time	21	65.6	68	75.6	89	73
Part-Time	11	34.3	22	24.4	33	27
Perc fit	20	62.5	21	23.3	41	33.6
Perc not fit	12	37.5	69	76.7	81	66.4
Basic + BSN	4	12.5	6	6.7	10	8.2

In general, the full-time/part-time split of the fit and not fit groups follows that of the whole group. Of interest is the observation that subjects are better at correctly identifying themselves as not fit. Only 62.5% of the subjects accurately judged themselves as fit while 76.6% correctly viewed themselves as not fit. Also of note is the fact that 3 of 8 nurses (37.5%) who were in fact fit felt that they were not fit. Do nurses tend to underestimate their fitness? Is this related to nursing's self-image? Research comparing nurses' perception versus actual fitness with other groups such as pharmacists and physicians would be of interest.

Table 9 Perceived Fit/P Not Fit & Other Variables

Variable	Perc Fit		Perc Not Fit		Total	
	N	%	N	%	N	%
Frequency	41	33.6	81	66.4	122	100
Fit	20	48.8	12	14.8	32	26.2
Not fit	21	51.2	69	85.2	90	73.8
Full-time	27	65.9	62	76.5	89	73.
Part-time	14	34.1	19	23.5	33	27.
Basic+BSN	6	14.6	4	4.9	10	8.2

Table 9 supports the notion of social desirability of fitness. More nurses perceive fitness than are actually fit. Only about half (20 of 41) of the subjects who perceive themselves fit are, in fact, fit. Yet perception of fitness is associated with lower stress levels in this study. Possibly these nurses are doing something else to reduce stress. This research could be replicated with the added objective of identifying other stress-reducing activities. Perhaps such activities as quilting, bird watching, or pet ownership may also be beneficial in mitigating stress. A question such as "What activities do you engage in to reduce your stress?" could identify other stress-lessening activities.

Another approach for additional research could be more study of those who perceive themselves as fit. Perhaps the hardiness qualities described by Kobasa et al. (1982) could be sought. Perception does seem to be important. Further

study of this area, which may be a problem area for nurses, could be of benefit to nursing.

Table 10 Full-time/Part-time & Other Variables

Variable	Part-time		Full-time		Total	
	N	%	N	%	N	%
Frequency	33	27	89	73	122	100
Fit	11	33.3	21	23.6	32	26.2
Not fit	22	66.7	68	76.4	90	73.8
Perc fit	15	45.5	26	29.2	41	33.6
Perc not fit	18	54.5	63	70.8	81	66.4
Basic+ BSN	3	9.1	7	7.9	10	8.2

In analyzing employment status it is evident that fit/not fit and basic + BSN groups closely correlate with the whole sample. A greater percent of part-timers perceive themselves as fit even though their actual fitness is only slightly better. Perhaps part-timers have time to engage in more diversional activities. They also are able to devote more time to things other than the stressful practice of nursing.

Table 11 Basic + BSN & Other Variables

Variable	Basic + BSN		Total	
	N	%	N	%
Frequency	10	8.2	122	100
Part-time	3	30	33	27
Full-time	7	70	89	73
Fit	4	40	32	26.2
Not fit	6	60	90	73.8
Perc fit	6	60	41	33.6
Perc not fit	4	40	81	66.4

The basic + BSN is a small group, which makes it difficult to make comparisons with other groups. As a group, they are slightly more fit. Their employment status closely follows the whole sample. Perception of fitness is much higher in this group. It may be that perception is the important factor. But perhaps the BSN completion program contributes significantly to the increased perception of fitness.

Limitations of time and financial resources dictated that the subjects be readily available to the researcher. Therefore, a sample of convenience was used. This method of sampling raises concerns about external validity. The findings of this study should not be generalized to nurses in other settings. The results apply only to nurses in the facility used in the study. It is possible that nurses participating in this study may not be representative of nursing as a whole.

Another threat to external validity includes the possibility that research participation affected the responses of subjects. The fact that subjects are involved in a study may cause them to respond differently than they would if not engaged in research. Replication of this study in a different setting with different subjects would address the concerns of external validity.

Concerns about internal validity, the possibility that the findings are related to uncontrolled factors, are present. History, events in the lives of subjects, certainly affects their stress. Subjects' stress levels may have been either raised or lowered by these events which can't be controlled. Selection bias can be a problem with subjects. About half of the subjects contacted agreed to participate. They may be different than those who chose not to join the study. Mortality can be a problem with nurse subjects who may tend to change jobs frequently. In this study, 153 nurses signed consents indicating their desire to participate. A total of 126 did participate. There were 27 potential subjects who were lost. Their participation may have altered the findings.

In this research, stress was measured one time. It is recognized that stress is variable in individuals. One subject suspected that her stress may have been heightened

level of stress may be obtained through determining a mean stress level from several measurements of stress over time. There is, of course, the risk of losing subjects with serial measurements especially with nurses where turnover can be substantial. It was felt that while some nurses may have had unusually high stress at the time of measurement, others may have had lower than usual stress. Since a large sample was used, the highs and the lows may compensate for each other.

There are some additional limitations. Male nurses were not included. The stress levels of this group could be studied. A questionnaire was used to determine fitness. A study which would compare fitness as determined through an exercise history form with fitness as measured on an ergometer may be of interest. Socioeconomic factors were not considered in this study. These factors may influence stress as well as the opportunities for fitness and the perception of fitness.

In this study, there were three hypotheses and two incidental findings that were found to be statistically significant at the $p < 0.05$ level. When the null hypothesis is rejected and the hypothesis is judged to be true, there is the possibility that a Type I error has been made. A Type I error is one in which the null hypothesis is rejected

used, there is a 5% possibility that the differences which were observed were due to chance alone.

Type II error must also be considered. Type II error occurs when the null hypothesis is not rejected when, in fact, it should be rejected because it is false. In this research there were null hypotheses that were failed to be rejected. Type II errors are possible. Replication of the study with a larger sample would reduce the probability of Type II error.

This research has generated several areas that should be pursued through further research. Several have been addressed that include study of the basic + BSN group. What is it about this group that results in them being less stressed? Research that compares nursing's perception of fitness with that of other professions could be done. The area of perception of fitness should be pursued. What are the factors which lead one to have a perception of fitness? Perhaps such factors as maintaining an ideal weight, refraining from smoking, eating a balanced diet, and using the stairs may contribute to the perception of fitness. Research that would ask not only subjects' perception of their fitness but also why they feel that way may offer insight into how the perception of either fitness or non-fitness is acquired.

Also, research exploring other stress-reducing activities may be done. Are some activities of more value than others? Stress of male nurses, which was not addressed in this research, could be studied. Determination of fitness through physiological methods could be compared with questionnaire-judged fitness. Serial determinations of stress levels could be compared with a single measurement to determine a range of stress in the individual. Finally, this study could be replicated in a different setting with different subjects. Random sampling would be desirable.

Despite the limitations that have been described, this research provides some valuable information for nursing. While exercise-induced fitness has been felt to be beneficial in reducing stress, this research shows a statistically significant relationship between fitness and lowered stress.

Perhaps of equal importance is the finding regarding perception of fitness. Individuals who viewed themselves as fit had significantly less stress in this study. Research into the area of perception of fitness as well as other stress reduction activities could be of benefit to the profession.

Also, this research suggest that nurses who go on to get a BSN are less stressed, as are part-time nurses. BSN

completion programs seem to somehow equip the nurse to better handle stress. This area can be researched.

The fact that less stress is associated with part-time employment status reinforces that nursing is stressful. Temporary reduction of status to part-time may be beneficial to nurses who find themselves highly stressed. Scheduling practices which permit more time away from the job and more paid time off may benefit the nurse by reducing some of the negative outcomes of stress.

Stress is a part of nursing. Indeed, it is a part of living and ends only with death. Stress is not necessarily bad. For example, it may provide the stimulus to keep current on treatment protocols so that one may perform appropriately in the event of an emergency. But too much stress causes excessive wear and tear on the body. Too much stress will lead to negative outcomes for the nurse. Therefore, it behooves nurses to deal effectively with stress. Nurses may wish to become physically fit, to acquire the perception of fitness, to work part-time, and/or to complete their BSN degrees. These accomplishments may assist them as they deal with the stressors of nursing and the stress of life.

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APPENDIX 1

Selye's Self-observable Signs of Stress (Selye, 1976, p. 174-178)

1. General irritability, hyperexcitation, or depression.
2. Pounding of the heart.
3. Dryness of the throat and mouth.
4. Impulsive behavior, emotional instability.
5. Feelings of unreality, weakness, or dizziness.
6. The overpowering urge to cry or run and hide.
7. Inability to concentrate.
8. Predelection to become fatigued and loss of the "joie de vivre."
9. Floating anxiety--being afraid but not knowing what one is afraid of.
10. Emotional tension and alertness, feeling "keyed up."
11. Trembling, nervous ticks.
12. Tendency to be easily startled by small sounds.
13. High-pitched, nervous laughter.
14. Stuttering and other speech disorders.
15. Bruxism, or grinding of the teeth.
16. Insomnia, which is usually a consequence of being "keyed up."

17. Hypermobility, an increased tendency to move about.
18. Sweating, readily detected by the galvanic skin response.
19. The frequent need to urinate.
20. Diarrhea, indigestion, queasiness in the stomach.
21. Migraine headaches.
22. Premenstrual tension.
23. Pain in the neck or lower back.
24. Loss of or excessive appetite.
25. Increased smoking.
26. Increased use of legally prescribed drugs.
27. Alcohol and drug addiction.
28. Nightmares.
29. Neurotic behavior.
30. Psychoses.
31. Accident proneness.

HEALTH PROBLEMS INVENTORY **

1=Never 2=Rarely 3=Sometimes 4=Often 5=Always

	1	2	3	4	5
1. I feel guilty when I say no to people.	—	—	—	—	—
2. I eat a poor daily diet.	—	—	—	—	—
3. I feel a sense of hopelessness.	—	—	—	—	—
4. I have too little time for social activities	—	—	—	—	—
5. I feel anxious.	—	—	—	—	—
6. I feel tired and run down.	—	—	—	—	—
7. I feel inadequate when caring for dying patients.	—	—	—	—	—
8. I have difficulty falling asleep at night.	—	—	—	—	—
9. I find it difficult to express my emotions (frustrations, anger, fear, sadness, etc.) in a constructive way.	—	—	—	—	—
10. I find it difficult to express concern, love, and warmth to those I care about.	—	—	—	—	—
11. I have difficulty relating to my peers.	—	—	—	—	—
12. I feel a lack of "structure" in my work environment.	—	—	—	—	—
13. I tend to view a difficult task as a problem rather than a challenge.	—	—	—	—	—
14. I lack a high self-esteem.	—	—	—	—	—
15. I have difficulty dealing with feelings toward persons of the opposite sex.	—	—	—	—	—
16. I find it difficult to give other people sincere compliments or recognition.	—	—	—	—	—
17. I feel a sense of failure.	—	—	—	—	—
18. I feel insecure.	—	—	—	—	—
19. I tend to get defensive when hearing constructive criticism.	—	—	—	—	—
20. I go on crash diets.	—	—	—	—	—

1=Never 2=Rarely 3=Sometimes 4=Often 5=Always

	1	2	3	4	5
21. I find it difficult to know what my strengths and weaknesses are.	—	—	—	—	—
22. I have money problems.	—	—	—	—	—
23. I have difficulty with conflict.	—	—	—	—	—
24. I lack self-confidence.	—	—	—	—	—
25. I find it hard to express my creativity.	—	—	—	—	—
26. I have difficulty accomplishing all that is required of me.	—	—	—	—	—
27. I find it hard to get 8 hours of sleep.	—	—	—	—	—
28. I feel pressure to achieve.	—	—	—	—	—
29. I feel lonely.	—	—	—	—	—
30. I have difficulty expressing my feelings.	—	—	—	—	—
31. I worry about things.	—	—	—	—	—
32. I have difficulty concentrating.	—	—	—	—	—
33. I fear failure.	—	—	—	—	—
34. I lack a spiritual awareness of a purpose in life.	—	—	—	—	—
35. I eat excessively between meals.	—	—	—	—	—
36. I feel depressed.	—	—	—	—	—
37. I am preoccupied with personal concerns.	—	—	—	—	—
38. I have difficulty prioritizing things in my life.	—	—	—	—	—
39. I have difficulty dealing with feelings toward friends of the opposite sex.	—	—	—	—	—
40. I have frequent minor illnesses(colds, sore throats, etc.).	—	—	—	—	—
41. I lack the necessary information/skills to solve some life problems.	—	—	—	—	—
42. I feel like giving up my chosen career.	—	—	—	—	—
43. I have too few close friends.	—	—	—	—	—
44. I am experiencing a changing relationship	—	—	—	—	—

1=Never 2=Rarely 3=Sometimes 4=Often 5=Always

	1	2	3	4	5
21. I find it difficult to know what my strengths and weaknesses are.	—	—	—	—	—
22. I have money problems.	—	—	—	—	—
23. I have difficulty with conflict.	—	—	—	—	—
24. I lack self-confidence.	—	—	—	—	—
25. I find it hard to express my creativity.	—	—	—	—	—
26. I have difficulty accomplishing all that is required of me.	—	—	—	—	—
27. I find it hard to get 8 hours of sleep.	—	—	—	—	—
28. I feel pressure to achieve.	—	—	—	—	—
29. I feel lonely.	—	—	—	—	—
30. I have difficulty expressing my feelings.	—	—	—	—	—
31. I worry about things.	—	—	—	—	—
32. I have difficulty concentrating.	—	—	—	—	—
33. I fear failure.	—	—	—	—	—
34. I lack a spiritual awareness of a purpose in life.	—	—	—	—	—
35. I eat excessively between meals.	—	—	—	—	—
36. I feel depressed.	—	—	—	—	—
37. I am preoccupied with personal concerns.	—	—	—	—	—
38. I have difficulty prioritizing things in my life.	—	—	—	—	—
39. I have difficulty dealing with feelings toward friends of the opposite sex.	—	—	—	—	—
40. I have frequent minor illnesses(colds, sore throats, etc.).	—	—	—	—	—
41. I lack the necessary information/skills to solve some life problems.	—	—	—	—	—
42. I feel like giving up my chosen career.	—	—	—	—	—
43. I have too few close friends.	—	—	—	—	—
44. I am experiencing a changing relationship with member(s) of my family.	—	—	—	—	—

PERSONAL DATA

Nursing unit:

Nursing education:

Years RN experience:

A. Basic program:

B. Additional degree(s):

Years IMHC experience

Marital status:

Full-time or Part-time?

Date of birth:

Type of exercise currently performed (please be specific):

Number of times per week each exercise is performed:

Length of time spent per week in each activity (minutes):

Heart rate during exercise (if known):

How long have you been engaged in your current exercise program?

If not currently exercising, how long since you did exercise regularly?

Circle the number corresponding to your current state of physical fitness:

Not fit

Fit

Highly fit

1 2 3 4 5 6 7 8 9 10

Dear Nurse Colleague

My name is Ron Gauerke; I work in the ICU/CCU here at IMMC. I would like to invite you to participate in some nursing research. In addition to working here, I am a student in the Master of Science in Nursing program at Drake University. Currently, I am working on my thesis which is a study of the relationship between fitness and stress levels in registered nurses. Nursing is a very stressful profession. Identification of methods to deal with stress would be beneficial to our profession.

I would appreciate your help in this research. You may help by agreeing to participate. Initially, you will be asked to sign the consent form (enclosed). Then, you will be given two forms to complete. One requests exercise information and personal data. Also, you will be given a Health Problems Inventory questionnaire which is designed to measure stress in nurses. These forms will take 20-25 minutes to complete. Stamped, addressed envelopes will be provided.

Be assured that your answers will be kept confidential. Your name will not appear on any of the answer sheets. Only group data will be reported. Results of this study will be reported back to participating units. If you would like a copy of the results mailed to you, include your address on the consent form.

Thank you for considering to join this research. Your help will be greatly appreciated. Hopefully, your part in the study will benefit nursing. Feel free to call me at work, Ext 6421 (I rotate days and nights), or at home (515) 752-8564 (collect) if you have any questions about this study. You may also contact my advisor, Dr Linda Brady, at Drake, 271-2830.

Sincerely,

Ronald D Gauerke RN, BSN, Masters in Nursing student
505 Eastview Rd

Mayfield Heights, Iowa 50159

HEALTH PROBLEMS INVENTORYDirections:

The statements on the following pages are designed to assess the stress levels of nurses. Please read each item carefully and mark an "X" in the column that applies to you.

1=Never 2=Rarely 3=Sometimes 4=Often 5=Always

Examples:

	1	2	3	4	5
1. Snoopy is a brave dog (This person feels that Snoopy is always brave.)	_____	_____	_____	_____	_____X
2. Heathcliff is a brave cat. (This person feels that Heathcliff is rarely brave.)	_____	_____X	_____	_____	_____

Complete this questionnaire in a quiet area at your home. Please read and respond to each item. Make sure that the blank that you are marking corresponds to the statement that you are reading. This is not a test; there are no right or wrong answers. Respond to each item with your real feelings. Your responses will be maintained confidential.

Your participation in this research is really appreciated.

You are invited to participate in a study of fitness and stress levels in registered nurses. I hope to learn if exercise induced fitness is associated with lowered stress levels in nurses at Iowa Methodist Medical Center (IMMC). You were selected as a possible participant because you are a nurse employed full-time or part-time at IMMC. Both critical care and non-critical care units were selected at random. Then, all full-time and part-time female nurses on those units were invited to participate. There will be approximately 120 nurse subjects in the study. I wish to obtain data from both exercisers and non-exercisers.

If you decide to participate, I will place a packet of materials in your unit mailbox. You will be asked to complete two forms. One form, the Health Problems Inventory (HPI), is a questionnaire designed to assess stress in nurses. The other form is a personal data form that seeks information relative to your exercise activity, your nursing unit, nursing experience, and some personal data. A pilot study indicates that these forms will take about 20 to 25 minutes to complete. It is hoped that your participation in this research will better enable nurses to cope with the stress inherent in nursing.

Any information that is obtained in connection with this study and that could be identified with you will remain confidential. Only group data will be disclosed. No individual information will be released.

Your decision whether or not to participate will not prejudice your future relations with the IMMC. If you decide to participate, you are free to discontinue participate at any time without prejudice.

If you have any questions, please feel free to ask. If you have any additional questions later, please contact me at (515) 752-8564 (collect) or my advisor, Dr Linda Brady, 271-2830. You will be offered a copy of this form to keep.

You are making a decision whether or not to participate. Your signature indicates that you have read the information provided above and have decided to participate. You may withdraw at any time without prejudice after signing this form should you choose to discontinue participation in this study.

Results of this research will be reported at unit meetings after the study has been completed. If you wish to have a summary of the results, include your address on this form and I will mail it to you.

Signature

Date

PILOT STUDY

Dear Nurse Colleague

Thank you for agreeing to participate in the pilot study group for my research. Your comments will contribute to the successful completion of this research. Please be candid with your comments. Use the back of this letter if more space is needed. Your input is greatly appreciated.

Part I. Oral presentation to unit.

- A. Was it helpful to have this presentation?
- B. Suggestions to improve this presentation:

Part II. Letter to participants.

- A. Did this letter entice you to join the study?
- B. Suggestions to improve this letter:

Part III. Consent form.

- A. Was the consent form clear?
- B. Suggestions to improve this form:

Part IV. Instructions.

- A. Are the instructions clear?
- B. Are they helpful?
- C. Suggestions:

Part V. Personal data form.

- A. How long did it take to complete?
- B. Were any questions unclear?
- C. Were any questions difficult?
- D. Suggestions:

Part VI. Health Problems Inventory.

- A. How long did it take to complete?
- B. Were any questions unclear?
- C. Were any questions difficult?
- D. Suggestions:

Thank you again for your assistance. Your contributions are very important to me. I really appreciate the time that you spent to help me.